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AN ELASTICITIES APPROACH TO ESTIMATING EXCESS DEMAND IN PRICE-CONTROLLED MARKETS

William M. Liefert

Economist

Centrally Planned Economies Branch

Economic Research Service

U.S. Department of Agriculture

1301 New York Avenue, N.W.

Washington, D.C.

202-219-0625

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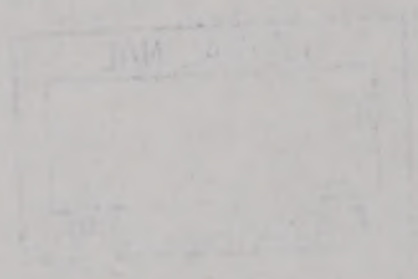

ABSTRACT

This paper develops a method for estimating excess demand in markets where state-controlled prices are set below market-clearing levels. The estimation equations express excess demand as a function of price elasticities of supply and demand. Although the method is most appropriate for empirical work involving centrally planned economies, it is not specific to that system. The procedure is then used to calculate excess consumer demand for meat in the USSR during the 1980's. Our best defended results from sensitivity analysis suggest that in the late 80's close to one quarter of the total quantity demanded of meat at state prices was not satisfied by purchase.

I. INTRODUCTION

A common feature of markets for consumer goods in centrally planned economies (CPE's) is excess demand, defined as consumers wanting to purchase more of a good at the existing price than is available for sale. Such shortages might exist despite planners' best efforts to have markets clear, say because of unexpected shortfalls in short-term production or a miscalculation of market-clearing prices. On the other hand, the excess demand might be long-term. A cause might be that money wages throughout the economy rise in excess of productivity gains, but planners keep consumer prices fixed or rising only slightly. This appears to be the explanation for the growing food shortages in the Soviet Union during the latter half of the 1980's. Chronic excess demand in an official market often spawns a parallel black market, in an attempt to find a market-equilibrating price. A legal parallel market might in fact be tolerated, an example being Soviet collective farm markets.

This paper develops a method for estimating excess demand in official markets in which controlled prices are below market-clearing levels. The method is conceptually valid whether or not parallel markets exist. Yet, it becomes more empirically useful if parallel markets either are absent or fail to provide data sufficient for demand estimation. Although the approach developed is most appropriate for empirical work involving CPE's, it is not specific to that system. It can be used to estimate disequilibrium excess demand in any economy in which controlled prices are below market-equilibrating values. In cases in which the data necessary for accurate estimation are lacking, the method has the merit of easy use for simulation exercises.

After development, the procedure is used to estimate excess consumer

demand for meat in the USSR during the 1980's. Although our calculations are admittedly rough, our mid estimates from sensitivity analysis suggest that in the late 1980's about three-quarters of total consumer demand for meat was satisfied by purchase. If so, excess demand equalled about one third of satisfied demand.

The second section develops the estimation procedure, while the third presents the estimates of excess demand for Soviet meat. The fourth section gives some conclusions.

II. THE ESTIMATION PROCEDURE

Much conceptual and empirical work has been done in the last 15 years on disequilibrium and shortages in CPE's. (For a discussion of conceptual issues, see the first six chapters of Davis and Charemza, 1989.) Empirical work has divided along two lines. The first estimates shortages or disequilibrium at either the macroeconomic level or in highly aggregated sectors. Examples include Howard (1976), Portes and Winter (1980), Podkaminer (1982), Collier (1986), Quandt et al. (1987), Burkett (1988), and van der Lijn (1990).

The second and less common type of work estimates shortages in specific markets. Using information provided by parallel markets, Alexeev (1987), Charemza et al. (1988), and Charemza (1990) compute excess demand in various consumer markets of socialist economies. The parallel markets provide the variable price and quantity data necessary to estimate a consumer demand curve, that in turn allows calculation of excess demand in the official state market.

This paper also creates a method for estimating excess consumer demand in individual markets. The approach is conceptually consistent with that of

Alexeev and Charemza, in that the main element in computing excess demand is a consumer demand curve in which domestic consumer price is a key functional variable.[1] The difference is that our method is a second best approach most useful when parallel markets do not exist, or provide insufficient data to estimate an acceptable consumer demand curve. Our method can also complement a parallel market approach by providing an easily-used simulation model. In the model estimates of excess demand change in response to alterations in values of key elasticities. A more detailed examination of the strengths and weaknesses of our method, particularly relative to the parallel market approach, is given after the development of the procedure.

Figure 1 depicts the market for a good in which the state fixes the price, P^1, below the market-clearing level. S is the supply curve, D^2 the consumers' demand curve, and D^1 the planners' demand curve. The quantity of the good demanded by "planners" at the existing consumer price is assumed to equal actual domestic consumption. Thus, D^1 is simply the domestic absorption schedule for the good (which means the approach is valid even if formal planners do not exist). At P^1 total consumption equals Q^4, the sum of domestic production (Q^1) plus net imports ($Q^4 - Q^1$). Disequilibrium excess demand equals $Q^6 - Q^4$.

We first present the intuition, and main assumption, behind our derivation of the equations for estimating excess demand. The assumption is that planners keep the percentage of initial (pre-trade) excess demand that is satisfied by imports constant (the assumption's legitimacy will be discussed shortly). In Figure 1 this means AF/AH = BC/BG. Thus, a strict relationship exists between S, D^1, and D^2 (specifically between line segments AB, CF, and GH). Over these ranges the curves can be represented by points A, F, and H and their elasticities. For most relevant countries data should be available

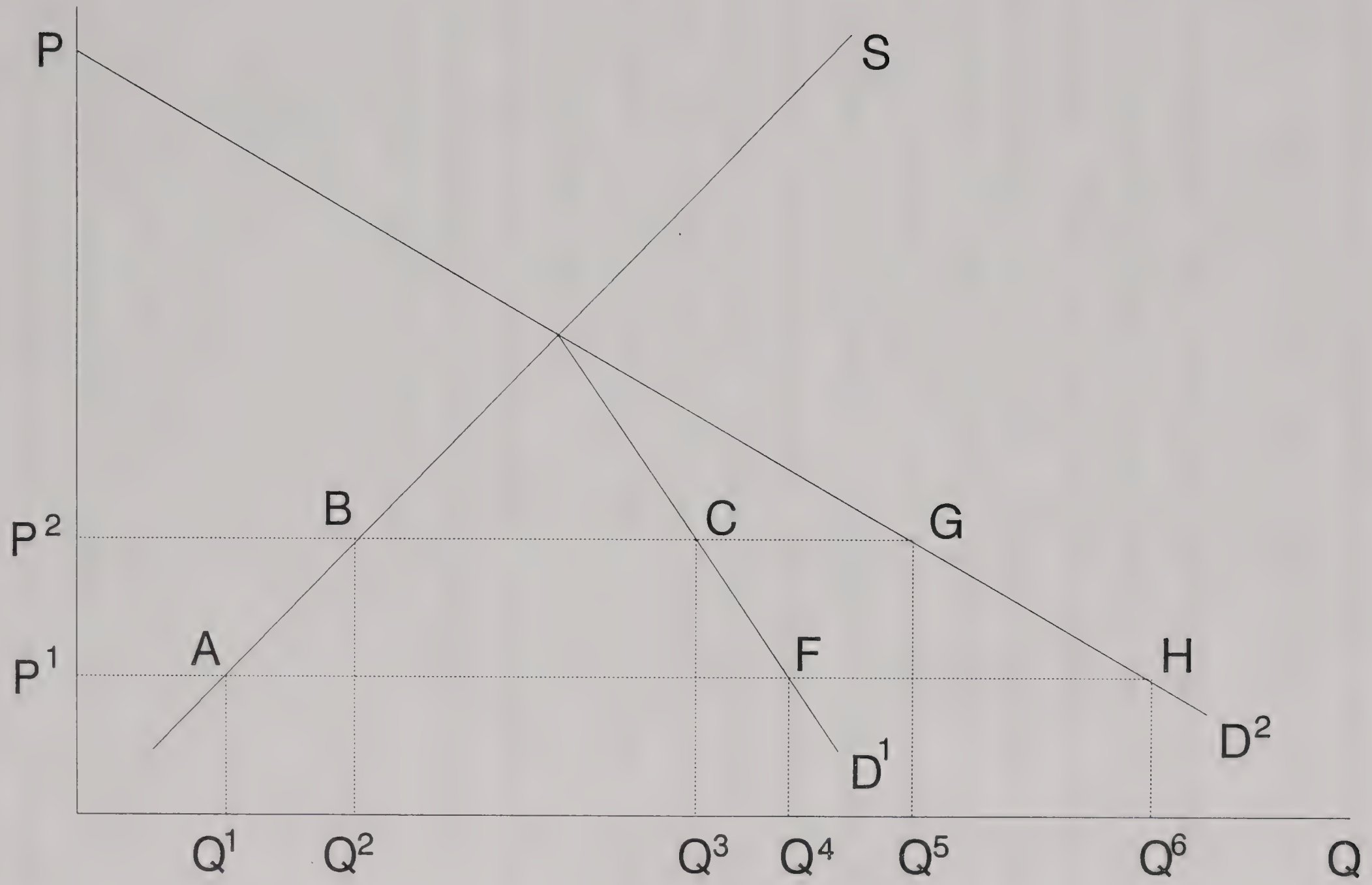

Figure 1. Market for a good in excess demand.

on domestic prices, production, and trade. These data would identify P^1, Q^1, and Q^4, which means points A and F would be known. The goal is to estimate Q^6, and thereby locate point H. We intend to derive an equation which expresses Q^6 as a function of Q^1, Q^4, and the price elasticities of S, D^1, and D^2.

The assumption made, that planners keep the percentage of initial excess demand that is satisfied by imports constant, would be questionable across the entire price range. In particular, how would the planners know the level of excess demand at various prices? All that the assumption requires, though, is that it hold within the immediate neighborhoods of the points on S, D^1, and D^2 corresponding to the existing price P^1 (points A, F, and H). In fact, as will be shown, the purpose of this assumption is to introduce the element of change in prices necessary to create elasticities in the equations for estimating excess demand. Since the derivatives in the elasticity definitions assume the price changes, and thus also the induced quantity changes, are infinitesimally small, the assumption appears reasonable. The large price change in Figure 1 is made solely for visual effect.[2]

Since the value we must estimate to compute excess demand is Q^6, we begin with an equation containing this variable. The formula for the price elasticity of consumer demand (E^c) provides such.

$$E^c = \frac{\frac{Q^5 - Q^6}{Q^6}}{\frac{P^2 - P^1}{P^1}} \qquad (1)$$

Because Q^5 and Q^6 are unobservable, we wish to replace Q^5 permanently, and Q^6 temporarily, with terms containing either observable values (Q^1 or Q^4), or elements that can be manipulated to form price elasticities of the curves in question. Because of the assumption that the ratio of imports to initial

excess demand is constant within the neighborhood of P^1, we can define k as

$$k = \frac{Q^6 - Q^1}{Q^4 - Q^1} = \frac{Q^5 - Q^2}{Q^3 - Q^2} \tag{2}$$

Solving for both Q^6 and Q^5 in equation (2) in terms of k, and then substituting into equation (1), yields

$$E^c = \frac{\dfrac{Q^2 + k(Q^3 - Q^2) - [Q^1 + k(Q^4 - Q^1)]}{Q^1 + k(Q^4 - Q^1)}}{\%\Delta P} \tag{3}$$

From equation (3) we can express k as follows:

$$k = \frac{Q^1(E^s - E^c)}{Q^1(E^s - E^c) + Q^4(E^c - E^p)} \tag{4}$$

where E^s and E^p are the price elasticities of supply and planners' demand, respectively. The derivation of equation (4) from (3) is presented in the Appendix A.

We can combine $k = \dfrac{Q^6 - Q^1}{Q^4 - Q^1}$ with equation (4) to solve for Q^6.

$$Q^6 = Q^1 + \frac{Q^1(E^s - E^c)(Q^4 - Q^1)}{Q^1(E^s - E^c) + Q^4(E^c - E^p)} \tag{5}$$

Equation (4) reveals that if E^c and E^p are negative and $|E^c| > |E^p|$, $k > 1$. This means $Q^6 > Q^4$, that is, the total quantity of the good demanded by consumers exceeds the amount actually consumed. E^c should exceed E^p in absolute value, for both intuitive and analytical reasons. Intuitively because consumers' demand should be more responsive to price charges than planners' demand; analytically because in Figure 1 D^2 is flatter than D^1. If $E^c = E^p$, $k = 1$. Consequently, $Q^6 = Q^4$, and thus no excess demand exists. This is understandable; if the elasticities of consumers' and planners' demands are

equal over the same price range, D^1 and D^2 are equivalent.

Values for Q^1, Q^4, E^s, E^c, and E^p would then allow one to estimate Q^6, and thereby excess demand $(Q^6 - Q^4)$. For many goods and countries, though, lack of data might preclude conventional statistical estimation of any or all of the elasticities. Using all relevant information and intuition, one could perhaps determine a plausible range of values for E^s and E^c. However, values chosen for E^p, which would reflect planners' preferences for satisfying consumer demand, would seem particularly arbitrary. To avoid having to determine a value for E^p, an adjustment can be made to equation (4) which allows one to substitute for either E^p or E^s a term containing two different elasticities. These are the price elasticity of demand for imports (E^m) and the price transmission elasticity (E^t). E^t equals the percentage change in the domestic price divided by the percentage change in the trade price. In a well-functioning open market economy, E^t should equal 1. In an economy such as the USSR in which domestic prices have been largely insulated from world prices, E^t would be between 0 and 1.

The substitution equation is derived as follows. From the relationship that net imports equal the quantity of a good domestically consumed minus the quantity domestically produced, one can obtain the equation

$$E^m = \frac{Q^a E^t E^p - Q^s E^t E^s}{Q^m} \qquad (6)$$

Q^m is the quantity of net imports, Q^s the quantity domestically supplied, and Q^a the quantity domestically consumed, or absorbed (Q^4 in Figure 1; for derivation of equation (6) see Kreinin, 1987, pp. 440-441). In our analysis imports equal the quantity demanded by planners, not consumers, minus the quantity supplied. Consequently, E^p, as opposed to E^c, is the relevant demand elasticity for equation (6). From the equation one can express E^p as

$$E^p = \frac{Q^mE^m + Q^sE^tE^s}{Q^aE^t} \tag{7}$$

In terms of Figure 1

$$E^p = \frac{(Q^4 - Q^1)E^m + Q^1E^tE^s}{Q^4E^t} \tag{8}$$

One can then substitute E^p from equation (8) into equation (5). Simplification yields

$$Q^6 = Q^1 + \frac{Q^1E^t(E^s - E^c)}{E^tE^c - E^m} \tag{9}$$

Appendix A shows how equation (9) is derived from (5) and (8).

Equation (9) technically can yield values for Q^6 such that excess <u>total</u> supply, rather than excess consumer demand, exists ($Q^6 < Q^4$). This would mean that domestic production plus net imports exceed the quantity demanded by consumers. The sets of specific elasticity values that would yield such a result in empirical work would probably be intuitively peculiar. This point demonstrates, though, that our approach does not assume the existence of excess consumer demand.

Whether equation (5) or (9) is used to estimate Q^6, a value for E^c, the price elasticity of consumer demand, is required. How E^c is determined is linked to the questions of whether parallel markets can be used to compute excess demand, and thus of the relative usefulness of our estimation method. As already mentioned, in empirical work on disequilibrium in which the data necessary to estimate consumer demand using conventional statistical techniques are unobservable, the main approach has been to base estimation on information from parallel markets. Although such work has provided useful results, it has unsurprisingly suffered from limitations in the data used and

the necessity of strong assumptions. Alexeev's (1987) estimates, for example, depend on the assumptions that Soviet consumers pay the same real price in official and parallel food markets, and that output supplied in collective farm markets is not a function of price.

Our approach can complement the parallel market method by providing a means by which the somewhat rough estimates using parallel markets can be checked. Assume that one has reasonable values of the price elasticities required by our estimation equations other than E^c. One could then use our equations and one's estimate of E^c from parallel markets to compute excess demand, and compare the result with the estimate from parallel markets. Alternatively, assume that one has good estimates of E^c and excess demand from data provided by parallel markets. Our approach could be used to gain an idea of the reasonableness of values for the other elasticities in our estimation equations. Such insights could then be used for other analytical purposes.[3]

If parallel markets do not exist or do not provide a satisfactory estimation of the demand curve, our method potentially becomes more useful. At first glance this statement might seem puzzling. Without the use of parallel markets to estimate E^c, how does one determine this key elasticity needed by our method? Our method is most useful when data are so poor that E^c can only be "guesstimated" through intuition or estimates borrowed from other countries. Perhaps the best approach, followed in this paper, is to use for a given good estimates of E^c for other countries with levels of per capita GNP and overall development most similar to that of the nation in question. Thus, the main usefulness of our approach might be to provide a method for easily performed simulations. A range of estimates of excess demand can be readily obtained given changes in the price elasticities of supply, consumer demand, and import demand.[4]

In CPE price-controlled markets suffering from excess demand, producer prices usually exceed consumer prices. This is because consumer prices are typically set low to shield consumers from paying the higher prices consistent with the marginal cost of production.[5] Our assumption in Figure 1 that producer and consumer prices are equal is made only for simplicity; our approach does not depend on it. Prices enter into the estimation equations only through the price elasticities. Thus, inequality of prices does not require adjustment of the estimation procedure.

A problem that has vexed empirical work on disequilibrium in CPE's, particularly macro estimates, has been the spillover of excess demand between individual markets. In terms of Figure 1, excess demand in other markets would shift the consumer demand curve right, thus creating even greater excess demand in this market. Conceptually our approach is valid for estimating excess demand both before and after a spillover. The challenge is wholly empirical—determining the price elasticity of consumer demand in the two scenarios.

III. APPLICATION OF THE ESTIMATION METHOD TO THE SOVIET MEAT MARKET

Although our procedure for calculating excess demand is most relevant for CPE's, the method is not specific to that economic system. It can be applied to any market and country in which the state sets prices below market-clearing levels, and regulates trade sufficiently to prevent imports from wholly satisfying quantity demanded at the state-set prices. Certain markets in non-CPE's might fit this description. The best examples are markets for foodstuffs, and particularly foodgrain, in many developing countries, such as Mexico, Egypt, Nigeria, Pakistan, India, Bangladesh, Thailand, and Indonesia. A brief description of these markets, and how our work can be applied to them,

follows.

Although the specific nature of foodgrain markets in these countries might differ, common characteristics exist. The government sells some fraction of available supplies to means-tested consumers at low fixed prices. Other output is sold in generally internally free markets, where prices are higher than the low state-set prices. The government controls trade, but tries to import enough to clear the free market.[6] Information concerning the total quantity consumers would like to purchase at the low state-set prices would be useful, particularly when prices on the free market rise or supplies become uncertain. The existence of an internally free market would provide useful data for estimating this "excess demand." For reasons identified when discussing parallel markets, though, our procedure might also be usefully employed in the estimation exercise.[7]

We, however, demonstrate our method of estimating excess demand using a socialist country; specifically, we compute excess consumer demand for meat in the USSR during the 1980's. Price-induced disequilibria and shortages in consumer markets have existed in the Soviet Union and other CPE's throughout the postwar period. Under Gorbachev, though, imbalance in Soviet food markets, especially for meat, has grown considerably.[8] We estimate excess consumer demand in the USSR for beef, pork, mutton, and poultry separately, though aggregate results are reported.

We ideally would like well-estimated values for the elasticities required by our calculation method. We, however, must resort to using synthetic estimates determined from eclectic information and procedures. Either the data necessary for conventional statistical estimation are not available, or attempts at estimation yield unsatisfactory results. Our calculations are intended first to demonstrate the estimation method derived, and its easy use

as a simulation tool. Yet, we also hope, through the aid of sensitivity tests, to shed some empirical light on the degree of shortages in Soviet meat markets.

Equation (5) or (9) could be used for calculation of excess demand. Equation (5), however, requires a price elasticity of planners' demand (E^p), which is equivalent to the price elasticity of the absorption curve for the good in question. Meat prices in Soviet state stores have lacked sufficient variability to estimate statistically an absorption schedule. Thus, intuition would have to be used to determine E^p. As discussed in the previous section, we feel that "guesstimating" reasonable values for E^p would be particularly difficult and arbitrary. Consequently, equation (9) is preferred for the calculations.

Equation (9) requires values for four price elasticities: consumer demand (E^c), domestic supply (E^s), import demand (E^m), and price transmission (E^t). Appendix B explains how the elasticity values are chosen; Table 1 presents the values. To provide some sensitivity analysis, three sets of values are used for E^c (as explained in Appendix B).

Table 2 presents our estimates of annual excess consumer demand for meat in the USSR from 1980 to 1989. The estimates equal our calculations of the quantity of meat demanded by consumers at state prices minus total consumption of meat obtained from all sources. The calculations confirm the established belief that excess demand for meat has existed throughout the 1980's, but has also been growing. The excess demand estimates increase not only in absolute terms, but at a higher rate (66 percent total growth for mid estimates over 1980-89) than actual consumption (31 percent growth). If our mid estimates are reasonably accurate, in 1989 around three-quarters of consumer demand for meat was satisfied by purchase. The estimates, though, are fairly sensitive

TABLE 1

ELASTICITY VALUES USED IN ESTIMATION OF EXCESS CONSUMER DEMAND FOR MEAT IN USSR

	PED[a] (low)	PED (mid)	PED (high)	Price E of domestic S	Price transmission E	Price E of import D
Beef	0.35	0.7	1.05	0.25	0.05	0.2
Pork	0.40	0.8	1.20	0.25	0.05	0.2
Mutton	0.45	0.9	1.35	0.30	0.05	0.2
Poultry	0.45	0.9	1.35	0.25	0.05	0.2

[a]Elasticities of domestic consumer and import demand have negative signs; domestic supply and price transmission elasticities have positive signs.

TABLE 2

ESTIMATES OF EXCESS CONSUMER DEMAND FOR MEAT IN USSR: 1980–89

(millions of metric tons)[a]

	Actual consumption	Excess D[b] (low)	Excess D (mid)	Excess D (high)
1980	15.60	1.84	3.50	6.65
1981	15.86	1.75	3.87	6.60
1982	16.03	1.78	3.94	6.71
1983	17.16	1.92	4.24	7.20
1984	17.50	2.20	4.58	7.64
1985	17.62	2.31	4.73	7.83
1986	18.49	2.46	5.00	8.26
1987	19.29	2.66	5.32	8.73
1988	19.92	2.93	5.70	9.25
1989	20.48	2.95	5.80	9.44

Sources: Consumption equals domestic production plus net imports. Production from Narkhoz and imports from Vneshtorg. Excess demand are own estimates.

[a]Includes beef, pork, mutton, and poultry.

[b]Low, mid, and high estimates result from low, mid, and high values for price elasticity of consumer demand from Table 1.

to changes in the values of E^c, as the results show, as well as of the other elasticities.

(Note to reviewers: This paper was completed just after the Soviets tripled consumer prices for meat in early April. If the paper is accepted for publication, this issue will be discussed. The obvious question will be, given our estimates of excess demand for 1989, the magnitude of the price increases, and the degree of consumer income compensation (still unclear), what can one say about balance in the meat market in 1991?)

The last year for which Brada and King (1991) estimate Soviet planners' perceptions of excess consumer demand for meat is 1984. They compute a value of 6.41 million metric tons, which lies between our 1984 mid and high estimates. (Though Brada-King and we are not computing exactly the same measure). Alexeev's estimate of per capita excess demand for meat in 1980 (1987, p. 553), the last year for which he makes calculations, yields a total excess demand of 17.62 million tons. Alexeev's and our calculations differ so much mainly because he appears to be estimating excess demand affected by demand spillover, as discussed in Appendix B. Although such estimates are useful, we attempt to compute non-spillover-affected excess demand. The values used in equation (9) for E^c are borrowed from countries (mainly Argentina and Brazil) whose domestic meat markets are generally well-functioning. Thus, we are trying to answer the question: If the Soviets were simultaneously to increase the supply of goods in all markets with excess demand such that the markets would clear at existing state prices, thereby eliminating all spillover effects, by how much must meat supplies rise? One merit of estimates of excess demand unaffected by demand spillover would be in determining the aggregate value of excess demand within sectors or across the entire economy (if computed for all markets and summed).

An interesting result is obtained if one uses for E^c in equation (9) Alexeev's estimate for the price elasticity of consumer meat demand of 2.4, but for all the other elasticity values in equation (9) uses those in Table 1. One computes that in 1980 Soviet excess demand for meat equalled 23.78 million tons. The figure can serve as an estimate of spillover-affected excess demand from our approach, and compares to Alexeev's calculation of 17.62 million tons. Thus, Alexeev's and our estimates become reinforcing, if common values for E^c are used.

IV. CONCLUSION

This paper develops a method for estimating excess demand in price-controlled markets. The usefulness of the approach decreases somewhat if price controls create parallel markets sufficiently well developed and data-rich to allow statistical estimation of a consumer demand curve. Yet, our approach can complement the estimation of excess demand from parallel market data by providing an alternative means of calculation. The method can also be used to determine whether, in a market subject to excess demand, a set of estimated or assumed price elasticities (for supply, consumer demand, and import demand) is collectively consistent. Our method, however, is probably most valuable as an easily-used simulation tool for computing excess demand in data-poor situations.

We use the method to produce admittedly rough estimates of excess consumer demand for meat in the Soviet Union during the 1980's. The estimates are rather sensitive to changes in the elasticity values necessary for calculation. Our mid estimates from sensitivity analysis suggest, though, that by the late 1980's excess demand equalled close to one quarter of the total quantity demanded of meat at state prices.

APPENDIX A: DERIVATION OF EQUATIONS FOR ESTIMATING EXCESS DEMAND

If two values appear in the appendix equation numbers, the first is the appendix equation number; the second is the equation's number in the text.

Part One: Derivation of text equation (4) from equation (3).

$$E^c = \frac{\dfrac{Q^2 + k(Q^3 - Q^2) - [Q^1 + k(Q^4 - Q^1)]}{Q^1 + k(Q^4 - Q^1)}}{\%\Delta P} \qquad (1;3)$$

$$E^c = \frac{\dfrac{k(Q^3 - Q^4) + (1 - k)(Q^2 - Q^1)}{kQ^4 - Q^1(k - 1)}}{\%\Delta P} \qquad (2)$$

Multiplying the two terms in the top numerator by Q^4/Q^4 and Q^1/Q^1, respectively, yields

$$E^c = \frac{\dfrac{kQ^4(Q^3 - Q^4)}{Q^4} + \dfrac{(1 - k)Q^1(Q^2 - Q^1)}{Q^1}}{\%\Delta P \cdot [kQ^4 - Q^1(k - 1)]} \qquad (3)$$

$$E^c = \frac{kQ^4E^p + (1 - k)Q^1E^s}{kQ^4 - Q^1(k - 1)} \qquad (4)$$

Solving for k yields

$$k = \frac{Q^1(E^s - E^c)}{Q^1(E^s - E^c) + Q^4(E^c - E^p)} \qquad (5;4)$$

Part Two: Derivation of text equation (9) from text equations (5) and (8).

$$Q^6 = Q^1 + \frac{Q^1(E^s - E^c)(Q^4 - Q^1)}{Q^1(E^s - E^c) + Q^4(E^c - E^p)} \qquad (6;5)$$

$$E^p = \frac{(Q^4 - Q^1)E^m + Q^1E^tE^s}{Q^4E^t} \qquad (7;8)$$

Substituting (7;8) into (6;5) yields

$$Q^6 = Q^1 + \frac{Q^1(E^s - E^c)(Q^4 - Q^1)}{Q^1(E^s - E^c) + Q^4(E^c - \frac{(Q^4 - Q^1)E^m + Q^1E^tE^s}{Q^4E^t})} \qquad (8)$$

$$Q^6 = Q^1 + \frac{E^tQ^1(E^s - E^c)(Q^4 - Q^1)}{E^tQ^1(E^s - E^c) + Q^4E^tE^c - (Q^4 - Q^1)E^m - Q^1E^tE^s} \qquad (9)$$

$$Q^6 = Q^1 + \frac{Q^1E^t(E^s - E^c)(Q^4 - Q^1)}{(E^tE^c - E^m)(Q^4 - Q^1)} \qquad (10)$$

$$Q^6 = Q^1 + \frac{Q^1E^t(E^s - E^c)}{E^tE^c - E^m} \qquad (11;9)$$

APPENDIX B: ELASTICITY VALUES USED IN ESTIMATING EXCESS CONSUMER DEMAND FOR MEAT IN USSR

The only study we could find that estimates E^c for Soviet meat is Alexeev (1987), which uses information from parallel markets for estimation, as described earlier. With data over 1958–80, Alexeev estimates a value of 2.4. The figure is more than twice that of the price elasticity of meat demand for any Western or developing country in the data bank of elasticities used by the Economic Research Service of USDA (see Sullivan et al., 1989). One likely reason for Alexeev's high estimate is that he appears to be computing an elasticity affected by demand spillover. He calculates the elasticity from price data from Soviet collective farm markets. Since before the late 1980's these were the only legal parallel markets in the USSR, they probably received much spilled-over demand. As explained why later in the text, we wish to compute excess demand not affected by demand spillover.

We obtain values for E^c for Soviet meat by examining those in Sullivan for countries whose per capita GNP and general level of development are similar to that of the USSR. The main countries scrutinized are Argentina and Brazil. Their consumer meat markets are generally well-functioning, and thus not affected by demand spillover. The values chosen range from 0.7 to 0.9. (Sullivan also presents values for the price elasticity of demand for the USSR. The values, though, are for planners', rather than consumers', demand, and are synthetic estimates. The separate figures given for beef, pork, mutton, and poultry all fall between 0.15 and 0.25.)

Because of the rough way in which the values for E^c are chosen and the importance of these values to the calculation of excess demand, sensitivity analysis is employed. Three estimates of annual excess demand are made based on three different sets of values for E^c: (1) the values just mentioned

ranging from 0.7 to 0.9; (2) values one half those in (1); and (3) values 1.5 times those in (1).

No empirical work could be found that rigorously estimates E^s for Soviet foodstuffs, the main impediment to estimation being sufficient lack of variation in producer prices. The values chosen are again based on figures for E^s for various countries from Sullivan. Mainly because of the rigidity of planning, agricultural production in the USSR and other CPE's has been less responsive to price than in market economies. Consequently, the values chosen are about half those for meat production in Sullivan for Western market economies. The values are 0.25 for all meats, with the exception of 0.3 for mutton.

Like producer prices for meat, consumer meat prices also lack sufficient variation for statistical estimation of E^t. Evidence and intuition, though, support choosing a very low value. From 1980 to 1989 the average annual change in the unit value of Soviet meat imports was 8 percent, with as much downward as upward movement (Vneshtorg). Soviet consumer prices for meat over this time, though, only rose, and by only an aggregate 10 percent (Narkhoz 1989, p. 131). Evidence shows that through the 1980's the Soviets did not completely insulate domestic prices from changes in world prices (see Treml and Kostinsky, 1982, pp. 20–24). To reflect, though, what appears to be very little responsiveness of domestic meat prices to import prices, we choose a value for E^t of 0.05.

Because of the greater availability of data on Soviet meat imports and import prices (unit values from Vneshtorg), E^m would seem to be the one required elasticity for which statistical estimation is feasible. No published estimates of E^m for Soviet meat could be found, though work has been on calculating E^m for Soviet grain. (The estimates vary considerably between

studies. For example, see Abbott (1979), Desai (1982), and Carson et al. (1984).). We have estimated E^m for Soviet meat imports over 1970–89, using a multiple of approaches: a linear versus log linear form; import quantities lagged by one year against prices versus unlagged; and current prices versus various attempts to obtain constant prices. None of the approaches yielded satisfactory estimates, as measured by correctness of sign or R^2. We conclude that a strong relationship between Soviet meat imports and import prices cannot be argued. Consequently, a value for E^m of 0.2 is chosen.

NOTES

[1]Using a different methodology that does not employ price-driven consumer demand curves, Brada and King (1989 and 1991) estimate planners' perceptions of excess consumer demand for grain and meat.

[2]The approach also does not require that S or D^2 be linear. For simplicity they are drawn as such in Figure 1.

[3]The existence of excess demand implies market disequilibrium. A well-functioning parallel market, however, could effectively equilibrate a price-controlled market. All output could be sold on the parallel market, at a clearing price (which could consist of nonmonetary costs). This would be the price determined by the point on the consumer demand curve that corresponds to the level of total domestic absorption of the good (Q^4). Regardless of whether or not such a market can be described as being in equilibrium, the volume of excess demand, as computed in this paper, would be useful information. Excess demand would now be defined as the quantity of the good consumers would like to purchase in the official market at the controlled price, minus the amount purchased in the parallel market.

[4]If a value for E^c is to be roughly chosen rather than statistically estimated, one might wonder why our more involved estimation equations are an improvement over the approach underlying the parallel market system of estimation. The latter requires knowledge only of the consumer demand curve and the actual level of consumption. Could not excess demand be more simply "guesstimated" by using our assumed value for E^c to create a consumer demand equation? The answer is a consumer demand equation requires an elasticity and a point on the demand curve. The absence of parallel markets precludes finding such a point.

[5]Such is the case in the USSR for foodstuffs. For example, Cook et al.

(1991) computes that in 1986 average state producer prices for a kilo of beef and pork were 4.5 and 3.2 rubles, respectively, while state consumer prices were 2.0 and 2.2 rubles.

[6]For a discussion of such policies, particularly with respect to India, see George (1983).

[7]The importance of determining excess demand in the price-controlled market depends partly on how large a role this channel plays in supplying consumers. For example, in India in 1975-76, the state-controlled channel supplied only 13 percent of total food grains to consumers. Yet, in certain regions, such as Kerala, it provided about 50 percent (George, p. 86). Thus, our procedure could be effectively used to examine regional and local, not just national, markets.

[8]For an examination of reasons why, see Schroeder (1990) and Liefert (1991). The simplest explanation, though, is that money wages have risen in excess of productivity gains, while consumer prices for food have remained fixed or increased only slightly. Thus, excess demand at official prices has grown.

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